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Practice and Conditions of Solid Waste Management in Ahmedpur East, Bahawalpur, Pakistan: A Way Forward

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Abstract: Solid waste management is a worldwide issue prevailing mostly in developing countries. Ahmedpur East is currently facing various environmental and health issues, including poor solid waste management (SWM). Therefore, the present study aimed to overview the solid waste practice and proposed few suggestions to bring improvement in the SWM. Primary data gathered through a field survey in three chowks of the city using a questionnaire from 120 sampled respondents and analyzed by applying descriptive statistics. Findings reveal that almost 95% of solid waste is inappropriately thrown open in the fields and streets and creating severe problems. Moreover, the generation rate of solid waste was expected to increase in coming years with expanding population. Inappropriate dumping of solid waste was created informal dumping points near the streets and roads and evolving pollution, diseases and garbage heaps widely possibly due to the significant shortage of solid waste containers and litter bins. The majority of the residents were not willing to pay any payment to the private waste collector, except few ones who were agreed to pay less than 100 PKR per month. TMA city was not fully accomplished with SWM due to faulty and limited equipments. Lastly, a few suggestions were proposed to bring betterment in SWM in the city.

Keywords: Solid Waste Management, Informal Dumping, Environmental and Health Problems, Willingness to Pay, TMA

1. INTRODUCTION

Solid waste management is one of the evolving issues of the present world that is more serious in nature in the cities of developing countries. Despite the investing a significant proportion of the municipal budget, the situation of solid waste management in most cities of the developing world is unsatisfactory like Pakistan (Altaf and Deshazo, 1996). The situation is even becoming worse with rapidly increasing urban population and poorly managed municipal services. Solid waste may be defined as non-liquid and non-gaseous by-products of anthropogenic activities and regarded as being discarded material (Babayemi and Dauda, 2009). Management of solid waste is a major public health and environmental concern in urban areas of many developing countries. The increasing volume of waste materials discharged to the environment and deteriorating the environmental quality in urban areas. Therefore, it is an issue of major concern for many governments worldwide (Ezebilo and Animasaun, 2011). Particularly in developing countries like Pakistan, the ineffective methods of solid waste dump, overflow and leakage of wastewater and poor drainage system greatly suffering the health of inhabitants (Mohsin and Anwar, 2015). Such practices which include poorly controlled open dumps and illegal roadside dumping can spoil landscape beauty; pollute soil and water resources, and pose health threats (Botkin and Keller, 2011). Generally, poor collection and improper transportation are responsible for the aggregation of municipal solid waste (MSW) in many parts of developing world's cities due to the increasing generation of waste and putting a huge burden on the municipal budget (Bundela *et al.,* 2010; Guerrero *et al.,* 2013). Currently, sustainable management of waste is a big challenge facing many of these developing countries from mega cities to small towns (Agbesola, 2013; UN-HABITAT, 2010). Flammable materials, such as plastic, paper, textile, wood and food waste, accounted almost 94.66% of MSW in Beijing (China) in 2008 (Wang and Wang, 2013). The generation of solid waste on household level is growing concern and has attained increased research emphasis in recent years (Samuel, 2015). Solid waste management is a major environmental and health hazard in the urban areas of developing nations like Pakistan (PMDFC, 2013; Shafqat *et al.,* 2014). There is great need to prioritize the issue by the local authorities and a combine approach is necessary to adopt for optimizing the whole MSW operation (Chandra and Devi, 2009). In this connection, by concentrating on sustainability matters; the incorporated use of the 3Rs (reduce, reuse and recycle) tool could prove very effective (Shekdar, 2009). The rate of generating waste is quite higher in the countries like Pakistan and it is estimated that generation of solid waste in Pakistan varies between

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0.283 to 0.612 kg/capita/day with an annual growth rate of 2.4% per year (Jadoon *et al.,* 2014; EPD, 2015). But the collection and transportation coverage in many cities is very limited e.g. in Lahore, the Pakistan's second largest city only 68% solid waste is collected (Masood *et al.,* 2014). Most of the waste contained organic particles (e.g. food items, vegetable and fruits remain) could be utilized through composting or generation of biogas (Al-Khatib and Arafat, 2010). So, keeping in concern the situation of solid waste management in Ahmedpur East, current study aimed to evaluate the practice and prevailing condition of solid waste management and proposed few suggestions to bring improvement in the SWM system.

2. MATERIALS AND METHIODS

Study Area: Ahmedpur East is a tehsil head quarter and rapidly expanding city in district Bahawalpur. It is situated between latitudes 29° 9' 0" N and longitudes 71° 16' 0" E at a distance of about 54 km south west of the Bahawalpur city (**Fig.1**). The population growth rate of Ahmedpur East is 3.14% as per last national census (1998) with a population of 96,415 individuals in 1998 that is estimated about 178,932 individuals in 2018 (PMDFC, 2013). With enhancing population, the city is facing various environmental and managerial problems like air pollution, deteriorating quality of water, sewage and sanitation and solid waste dumping etc.

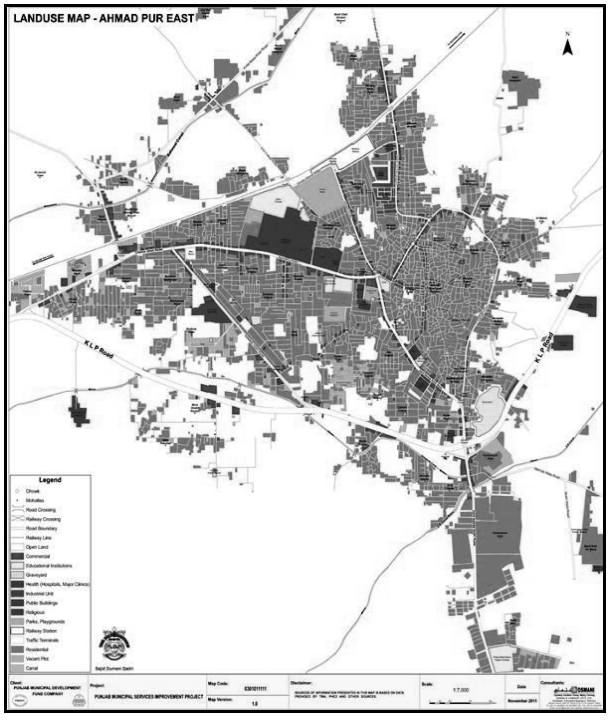

Fig.1: Land use Map of Ahmedpur East City
Source: Tehsil Municipal Administration (TMA), 2015

Data Collection and Analysis Procedure: Current research is mainly based on 'Situation Analysis Report for Integrated Solid Waste Management (ISWM): Ahmedpur East 2013' published by Punjab Municipal Development Fund Company (PMDFC), under the cooperation and guidance of Local Government and Community Development (LG and CD) Department, Government of Punjab with a clear aim of devising and formulating an Integrated Waste Management (IWM) plan for the foremost vision of 'litter free Punjab' (PMDFC, 2013). The study briefly reviewed the overall situation of solid waste management represented in the report and partially utilized and further expanded the opinionnaire used to capture the opinions of total 120 respondents as samples. The data collected in focus group discussions conducted in three different parts of the main city (Chowk Munir Shaheed, Chowk Chacha Basti and Chowk Abbasia). Selected attributes were asked for knowing the respondents' views about solid waste management system in the city. Data arranged in tables and analyzed with descriptive statistics (percentage method). The results were portrayed in the form of graphs (**Fig.2**).

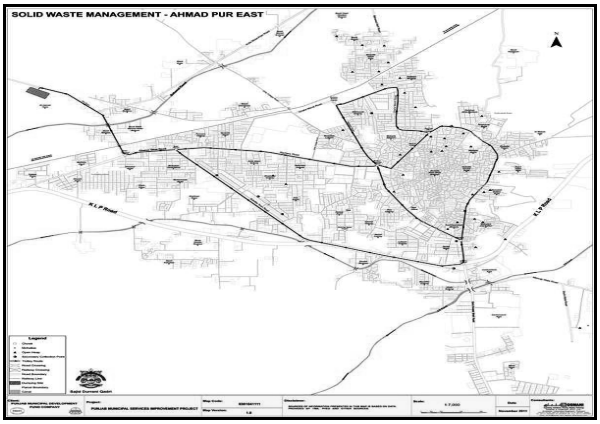

Fig.2: Solid Waste Management Map of Ahmedpur East City
Source: Tehsil Municipal Administration (TMA), 2015

3. RESULTS AND DISCUSSION

Situation of Solid Waste Management in Ahmedpur East

Due to the acceleration in population growth, the city is expected to face an increase in solid waste generation and its associated problems in forthcoming years. Generally, the condition of solid waste management is very poor in Ahmedpur East as compare to other cities of district Bahawalpur and Punjab province. About 95.4% solid waste is thrown in open fields or streets and causing severe sorts of environmental and health related issues (BOS, 2009). In 2013, the rate of daily solid waste generation was 0.457 kg/capita/per day and about 61.32 tons/day that is expected to enhance 0.531 kg/capita/per day and about

95.52 tons/day by the year 2023. The primary collection of solid waste is mainly done by sanitary workers those sweeps and collects solid waste from streets and roads using grooms and wheel carts and dumps it into collection points (**Fig. 2**). The coverage area of solid waste collection is 70%, while remaining 30% is partially covered. Currently there is a limited door to door collection system of solid waste and is no private partnership involved in the solid waste management process. The secondary collection of waste is even worse to handle a large amount of waste and efficiency is just 25%. Most of the solid waste collection operation is done by the Tehsil Municipal Administration (TMA) with the help of 6 tractors, 4 trolleys (loaders). Other mechanical equipments either are not existed or out of functioning as 5 open steel containers and 2 container carriers were not operational. There were 206 sanitary workers worked, mostly involved in the primary collection of solid waste from different parts of the city (**Fig.3**). The collected waste finally disposed at a landfill site with an area of 12 acres developed by Southern Punjab Basic Urban Services Project (SPBUSP) as it is found that sanitary landfills were more effective compared to many other methods of solid waste disposal and open dumping practice should be replaced with this (Awomeso *et al.,* 2010) (**Fig.4**). Fortunately, the provincial government is keen on improving the overall situation of solid waste management system (SWMS) in the city and in last three preceding years considerable amount of budget is allocated and spent by TMA on SWMS. For the fiscal year 2010-11, total 27.36 million PKR were allocated for the management of solid waste. Later, the amount was considerably increased to 74.91 million PKR in the year of 2013-14 to develop the SWMS with mechanized equipments (PMDFC, 2013). But, still there is a big gap between the existing sporadic solid waste management and authorities' attempts to bring the betterment.

Fig. 3: A Waste Worker Collecting Waste

Fig.4: Landfill of Solid Waste Dumping in Ahmedpur East

Improvement in Solid Waste Disposal

The overall situation of solid waste disposal in the city is highly inefficient and threatens the surroundings. A previous study indicated that in many small towns of Pakistan, 76% of generated solid waste is not properly disposed off rather thrown on land openly which cause many diseases (Bashir *et al.,* 2014). Fig.5 portrays that 50% respondents each were replied that there is significant need to bring improvement in the disposal situation and same number of respondents have suggested that there is no need to bring significant improvement in the solid waste disposal. Most of these respondents were the residents of Satellite town, Shadman colony and Riaz colony where is the overall situation of solid waste collection and disposal is comparatively better than the rest of the areas.

Problems of Poor Solid Waste Management

The improper disposal of solid waste creates several kinds of problems that are affecting the life of residents of nearby areas either directly or indirectly. Fig.6 portrays that due to improper management of solid waste, 25% respondents were suffered in epidemic diseases like skin and allergic problems, 50% were argued about environmental pollution due to poor management of solid waste and the rest of 25% said that uncollected waste material creates heaps of garbage polluting the environment badly. These results suggest that the residents of the study area were at a great risk to the exposure of harmful diseases because poor solid waste collection, sanitation and hygiene are environmental sources of ill-health.

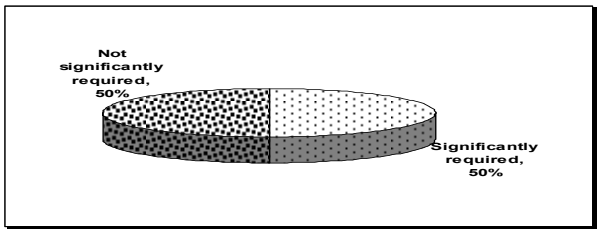

Fig.5: Improvement in Solid Waste Disposal

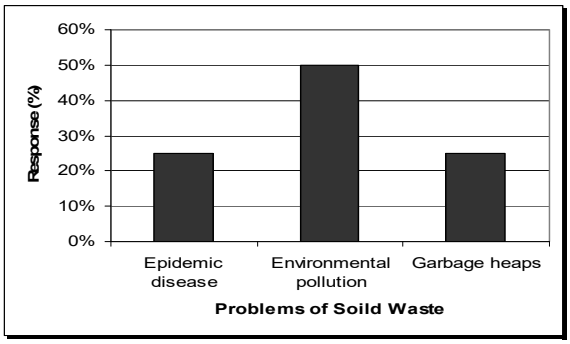

Fig.6: Problems of Poor Solid Waste Management

Existence of Informal Dumping Points

Informal dumping of solid waste is a common phenomenon in most of the cities in developing countries that also make the situation more serious in nature and difficult to tackle. Fig.7 clears that similar problem witnessed in Ahmedpur East city where 75% respondents told that solid waste (most of organic waste) thrown nearby streets, drains, pathways or on roads and formed informal dumping points in many densely populated parts of the city. These informal dumping places seldom clean and removed by the TMA and often become a permanent place of open solid waste dumping and originating many environmental and health hazards. About 25% respondents were having no idea about these informal sites of solid waste dumping due to unawareness.

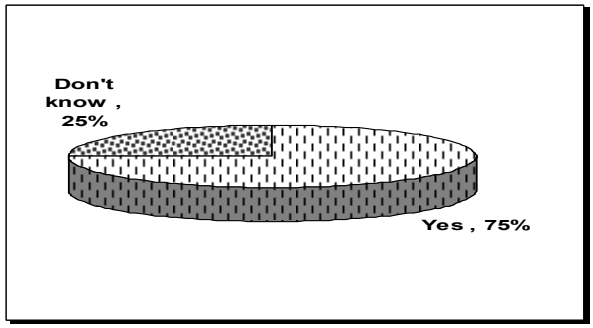

Fig.7: Existence of Informal Dumping Points

Placement of Solid Waste Container/ Waste Bins

There were no solid waste containers or waste bins placed near streets or roads for solid waste collection in the city by TMA. The majority of the respondents (75%) replied that due to the absence of a solid waste container or litter bins they are forced to throw the solid waste on roads or in the streets openly (**Fig.8**). About 25% respondents were unaware about these solid waste containers and waste bins due to illiteracy and careless behavior.

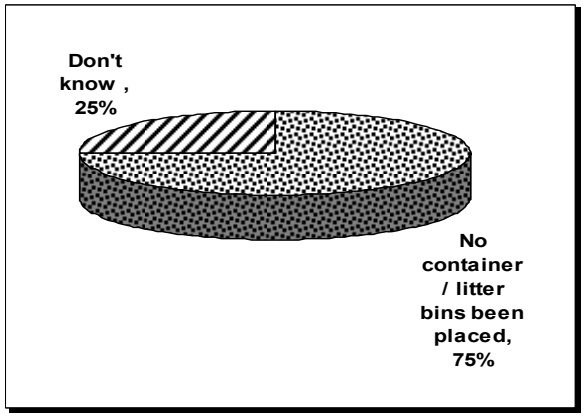

Fig.8: Placement of Solid Waste Container or Bins

Willingness to Pay for Solid Waste Collection

Poverty and behaviors of individuals are believed two major factors hindering to achieve a sustainable and safe environment. Similarly, there is high poverty, unemployment and backwardness observed in Ahmedpur East. The majority of the people were hand to mouth by the level of income. Another major reason of this flaw might be the thinking of households considered the solid waste collection service is a local government's responsibility or they might consider this service is less significant than water and sanitation services (Altaf and Deshazo, 1996). When the residents were asked about their willing to pay for bringing improvement in solid waste collection and disposal system they loudly denied this. Results show that just 25% respondents were ready to pay less than Rs. 100 PKR per month for solid waste collection and disposal works. Whereas remaining 75% respondents were disagreed with this possibly because of no willingness or financial problems (**Fig.9**). So, in this scenario, it can be inferred that there would be very little success if the charges over the solid waste collection are introduced (Aggrey and Douglason, 2010).

Expected Improvement in Service after making the payment

The residents were explicitly expressed that after making payment for proper solid waste collection and disposal regularly, the current inauspicious situation of solid waste management could be greatly bettered. About 35% respondents were argued that solid waste collection work would be done regularly, 40% replied that availability of formal dumping points could be possible, 15% answered that the cleanliness of streets would be arranged regularly and remaining 10% proposed that the environment of the residents could be safe and clean **(Fig.10)**.

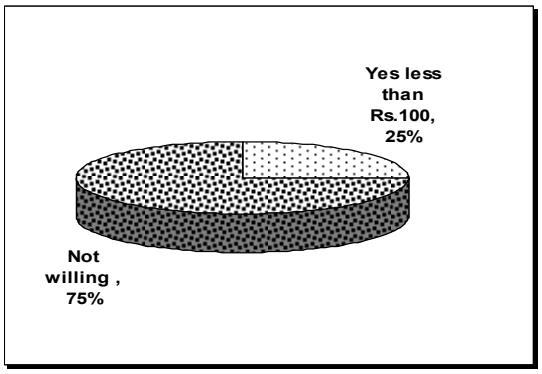

Fig. 9: Willingness to Pay for SW Collection

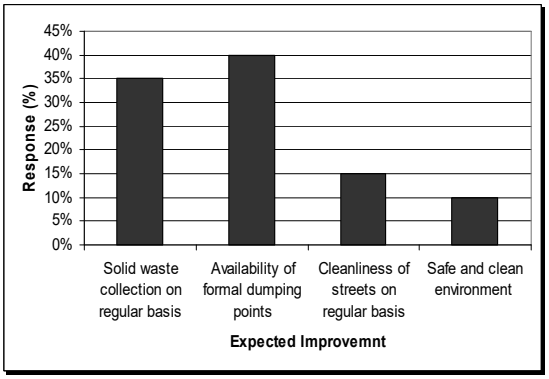

Fig. 10: Improvements in Service after Made Payment

4. CONCLUSION

Ahmedpur East is currently facing various environmental and health issues wherein poor management of solid waste is much degrading and challenging for residents. The findings of the study evaluated the solid waste situation in the light of residents' perceptions. A huge quantity of solid waste (95%) is inappropriately thrown in the fields and streets open and creating severe problems for environmental pollution and diseases. TMA city is unable to fully achieve the successful primary and secondary collection and disposal of solid waste due to faulty and limited equipments. The current generation rate of solid waste is 0.457 kg/person/day that are expected to increase in coming years. The current situation of solid waste is greatly needed to be improved because it causes the various problems. Informal dumping points in the city were common where the majority of the residents thrown waste material in the very shortage of waste containers and litter bins. The majority of the residents were not willing to pay (WTP) any payment regarding solid waste collection and disposal while few were agreed to pay a nominal fee per month because most of them were poor and unable to afford the monthly payment. After making payment residents argued that it could bring improvement in solid waste collection, availability of formal dumping points, regular cleanliness of streets and develop safe and clean living environment. On the basis of findings, a few suggestions were elicited to bring improvement in solid waste management;

- TMA city should place waste containers and litter bins near streets and edges of roads.
- Residents should avoid throwing waste in streets, drains, and pathways.
- Public awareness of SWM should be disseminated and private sector involvement should be encouraged.
- Efficient utilization of allocated budget for project development and staff training of SWM should be done.
- Dumping points should be accessible for residents for ease self disposal.
- Procurement of efficient handling machinery for primary and secondary collection should be practiced.
- Open garbage heaps should replace with covered waste containers.
- Organic waste should be composted at backyards and nurseries to get additional benefits of organic fertilizer and bio-gas generation.
- The landfill site operation could be possible by the participation of nearby communities.
- Hazardous waste (medical, chemical, slaughter house waste etc.) must not mix with municipal solid waste and disposed off properly.
- Sanitary workers should procure with safety equipments.

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